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Revisiting the Past and Back to the Future: Memory Systems and the Linguistic Representation of Social Events

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Five studies were conducted to investigate the relationship between how people communicate about social events and how representations of these events are stored in memory. It was hypothesized that more distant events in memory would be described with more abstract linguistic predicates, and recent events with more concrete language. The 1st study supported this hypothesis. The 2nd and 3rd experiments demonstrated that abstract predicates used as prompts elicit memories that are significantly more removed in time than concrete predicates. Two final experiments showed that these outcomes are not merely a function of the type of semantic cue but an interaction between memory and preferential predicate use. The findings illustrate a link between memory and communicative behavior of a type that has not been previously studied. The results are discussed in terms of a recent, well-supported model of 2 separate fast-learning and slow-learning memory systems.

How do human beings store past events in memory, and how are the linguistic representations of these events structured in communication? More specifically, the question we address in this article is the following: What is the nature of the connection between (a) how events that have taken place in the recent versus distant past are stored in memory and (b) how they are communicated linguistically? We regard this type of question as important, because an informed answer to such a question would furnish a bridge between intra- and interpersonal processes by establishing how cognitive (memory) and social (communication) processes interface. The five studies reported here represent an attempt to establish such a bridge.

One starting point to tackle this issue is to examine the social means by which the communication of events is temporally marked. This requires an identification of the types of linguistic devices that indicate differing temporal frames in communication. The obvious and less interesting devices that can be identified are

(a) the explicit use of grammatical tense to refer to past and present or (b) explicit and direct temporal references (*on May 4, yesterday, 2 years ago, at 3:30, etc.*). The more intriguing question is whether there exist implicit or tacit linguistic devices by which an event that has taken place in the more recent past can be differentiated from one that has taken place in the more distant past. In other words, are there linguistic tools, or properties of such tools, that implicitly mark and indicate the graded anchoring of a temporal perspective on an event?

It is known that the predicates (verbs, adjectives) used in depicting social events contain a wide range of implicit or tacit properties (Semin, 1998). These properties have been shown to systematically mediate different types of inferences made by recipients of a communication (e.g., Semin & de Poot, 1997). For example, one extensively researched property of interpersonal verbs is the systematic marking of who caused or initiated an event (e.g., Brown & Fish, 1983). Interpersonal verbs and adjectives have multiple inference-inviting properties that have been shown to lead to systematic differences in dispositional inferences (Semin & Marsman, 1994), attributions of salience (Kasoff & Lee, 1993), and inductive and deductive generalization (Abelson & Kanouse, 1966), *inter alia*. It has also been established that such predicates convey differential information about the duration of an event (Semin & Fiedler, 1992).

In general, most of these inferences have been found to be a function of the degree of abstractness–concreteness of the predicate type or category, as proposed and operationalized by the linguistic category model (Semin & Fiedler, 1988, 1992), which is a model of the properties of interpersonal predicates. For instance, when an event is depicted by a concrete predicate (e.g., a verb of

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action: *to hit*, *to hurt*), then it is inferred to have lasted a shorter time than when it is depicted by a verb of state (*to hate*), which in turn is expected to last a shorter time than an adjectival (aggressive) depiction of the event.

Earlier research with the linguistic category model has shown that abstract predicates do not preserve references to contextual detail and are detached from "the here and now." In contrast, the use of concrete predicates is contextualized (Semin & Fiedler, 1988; Semin & Greenslade, 1985). They are understood with reference to the immediate event. It is thus possible, by implication, that concrete predicates are temporally bound, whereas abstract terms are more removed from the here and now. Thus, predicates differing in abstraction may be used as a device to mark temporal frames. Relatedly, but from an entirely different theoretical perspective, temporal construal theory (Liberman & Trope, 1998) suggests with regard to future events that "construals of distant future events contain more essential and abstract features compared to construals of near future events" (p. 5), and in their recent research Liberman and Trope (1998, Study 1) showed that this is the case. By implication, one could argue that abstract predicates are most appropriate to mark events at a distant point in time, whereas concrete predicates are ideally suited to mark the specificity of events that have taken place in the more recent past. This would lead one to expect that the temporal frame of narratives, in the case of events that have taken place in the distant past, would be indicated by the predominant use of abstract predicates (e.g., adjectives). In contrast, narratives about events that have taken place more recently should contain a preponderance of concrete predicates.

The above examination of the direct-explicit and indirect-implicit properties of linguistic tools gives one an idea of the possible socially available means by which the temporal marking of events can be indicated in communication. It does not tell one how and when such predicates will be used. The actual deployment of such tools is constrained by psychological factors. The examination of the tools provides an idea of the properties of the available devices, as well as the range of things that one can possibly afford with them (Semin, 1998) in order to communicate temporal frames. What people actually do communicate is influenced by their intrapsychological goals or intentions (Gollwitzer & Moskowitz, 1996) and by the intrapsychological constraints that impinge on how they communicate. Although the former—goals and intentions—may be influenced and driven by contextual and deliberately monitored factors (e.g., one may want to deceive, reassure, or tell someone something), the latter are more systematically defined in terms of the types of memory constraints that operate on the retrieval of recent or distant past events. In order to build the second pillar of the proposed interface between social and cognitive processes, one must consider the details of how such events are stored. This, in turn, will provide information about the constraints that are likely to influence the choice of linguistic devices and, consequently, how the representation of recent and distant events is structured in communication.

The most relevant constraints imposed by the properties of human memory involve the relative prominence of central or *gist* aspects of an event versus irrelevant details or contextual information. Recently experienced events are represented with more specific and concrete details; for example, you may be able to recall what type of sandwich you ate for lunch yesterday, what

color the lettuce leaves appeared to be, the orientation of the sandwich on your plate, and so forth. In contrast, for more distant events such concrete details are less prominent, and only those aspects important for the central meaning of the event—its *gist*—tend to be preserved. Asked about what you ate at a family holiday dinner a year ago, for example, you may be able to recall only that you had roast beef, without any perceptual details being available. Many studies of autobiographical memory have documented this typical difference in the representations of older versus more recent events (Thompson, Skowronski, Larsen, & Betz, 1996; McClelland, McNaughton, & O'Reilly, 1995). Squire, Cohen, and Nadel (1984) referred to the schematic quality of more distant memory, which loses arbitrary and unimportant details while emphasizing what is most central for the meaning of an event.

Experiment 1

From these linguistic and psychological considerations, we derive the specific hypothesis for this article: The age of a past event stored in memory is linked to its relative linguistic abstractness. Older events will be characterized by more abstract communication, and recent past events, by more concrete communication. Thus, our goal in this article is to show that properties of memory have direct implications for social behavior, specifically for communicative language. In Study 1 we conducted perhaps the most direct initial test of this idea by asking participants to describe events that occurred at different times in the past and coding their descriptions for linguistic abstractness level. When people are asked to report about events that have taken place in the distant past, these events are likely to be stored in relatively schematic form. Therefore, when they describe or report these events, they should be very likely to use abstract predicates. In other words, people should be more prone to use generalizing language and less likely to refer to contextual detail and particulars. In contrast, if people are asked to depict an event that has occurred in the very recent past, then this event is more likely to be stored with rich contextual details. Consequently, narratives of such recent events should be less likely to use abstract predicates. That is, people should be less prone to generalize and more likely to refer to concrete and contextual features of recent events.

It is possible that recent and distant events that people recall differ systematically in other ways that may be related to the differential use of abstract and concrete predicates. For instance, the more distant events that one retrieves may be more important ones, or they may be more emotional experiences, or they may have been talked about more often. Moreover, one would expect more recent events to be more vividly recalled than older ones. All these factors may be directly related to the abstraction level of narratives. In order to examine the potential influence of such factors on predicate use in narratives, we controlled for them as dependent variables. Furthermore, event valence constituted an additional within-subjects variable in order to control for any possible systematic retrieval effects that may be driven by the positivity or negativity of past events.

Method

Participants

Fifteen undergraduates at the Free University Amsterdam participated in this study on a paid voluntary basis. All participants were native Dutch speakers.

Design

The study had a time (recent vs. distant past) by valence (positive vs. negative) within-subjects design.

Procedure

Participants were given a brief verbal introduction by a female experimenter and then provided with a questionnaire that required them to recall four events. The questionnaire started with the following description of their task:

This study is an investigation of how people remember significant events. What we would like you to do is to think about a significant event that happened to you *in your recent past, namely no more than a week or two ago [a long time ago, at least a year ago]*. In selecting such an incident from your memory we would like you to think about an event that was a *positive [negative]* one. You can use the rest of this page and the following one to describe the event. After you have completed the description of the event we shall be asking you some questions about it. Obviously, we shall treat all your answers confidentially.

Participants were then given some general instructions about how to use 7-point scales. The order of the four event prompts was randomized across participants.

Dependent Variables

Abstraction level of narrative. We measured the abstraction level of the narrative in terms of the types of interpersonal verbs (verbs of action and verbs of state) and adjectives that were used to depict the event. This task was undertaken by two independent coders who were blind to the hypotheses under examination. The intercoder reliability was high (93% agreement). Narrative abstraction was accomplished by a simple monotonic weighting schema using 1, 2, 3, and 4 to weight descriptive action verbs, interpretive action verbs, state verbs, and adjectives, respectively. The resulting score can be considered an ordinal scale reflecting the degree of abstraction and ranges between 1 and 4 (cf. Semin & Fiedler, 1989).

Qualitative differences between events. Qualitative differences between events were measured by four sets of variables. Event importance was measured by asking "How important was this event to you?" (1 = *not at all important*, 7 = *very important*). (b) Event emotionality was measured by asking "To what extent was this event an emotional one?" (1 = *not at all*, 7 = *very much*). Event vividness was measured using five 7-point scales to tap vividness of recall. These were as follows: (a) "How vivid is the event you have just described in your memory?" The endpoints of the scale were *not at all vivid* (1) and *very vivid* (7). (b) "How well do you remember the details of the event?" The endpoints were *not at all well* (1) and *very well* (7). (c) "Can you clearly visualize how the situation unfolded when you think about the event?" The endpoints were *not at all* (1) and *very well* (7). (d) "How easy was it to recall the type of event we asked you for?" The endpoints were *very difficult* (1) and *very easy* (7). (e) "How easy was it to describe the event?" The endpoints were *very difficult* (1) and *very easy* (7). Degree of rehearsal was measured by asking "How often have you talked to others about this event?" The endpoints were *not at all* (1) and *very often* (7).

Results

Abstraction Level of Narrative

We entered the abstraction score in an analysis of variance (ANOVA) with time (recent vs. distant past) by valence (positive vs. negative) as the two within-subjects variables. The predicted outcome was an main effect for time. Events in the distant past were expected to be more abstractly narrated compared with recent events. This main effect was significant, $F(1, 14) = 5.13, p < .04$. Participants used more abstract language when describing temporally distant events ($M = 2.68, SD = 0.12$) than when describing more recent events ($M = 2.57, SD = 0.18$). No other effects were observed.

Narrative Length

We analyzed the length of the narratives as a function of time (recent vs. distant past) and valence (positive vs. negative). This two-variable within-subjects ANOVA yielded a significant main effect due to time, $F(1, 14) = 5.13, p < .05$. Narratives of recent events were shorter (mean number of words = 130.47, $SD = 53.52$) than narratives of events from the more distant past (mean number of words = 161.70, $SD = 50.14$). An examination of whether this difference in length might have affected abstraction level showed that this was not the case. Length as a covariate was not significant, $F(1, 13) = 0.80$, and did not effect the time main effect.

Qualitative Differences Between Events

Event importance. An analysis of event importance as a function of time (recent vs. distant past) and valence (positive vs. negative)—both within-subjects variables—yielded only one main effect due to time, $F(1, 14) = 8.46, p < .02$, showing that recent events were not judged to be as important ($M = 5.03, SD = 1.34$) as past events ($M = 5.93, SD = 0.84$). A reanalysis of abstraction level with event importance as the covariate showed that the covariate was not significant, $F(1, 13) = 0.66$, supporting the conclusion that the main effect of time was not affected by event importance.

Event emotionality. This analysis yielded only a main effect due to valence, $F(1, 14) = 6.91, p < .05$; positive events were reported as being more emotional ($M = 4.53$) than negative ones ($M = 3.20$).

Event vividness. The five variables measuring event vividness were combined into a scale (average Cronbach's $\alpha = .81$), and an analysis of vividness as a function of time and valence yielded no significant effects, all $F_s < 1$.

Degree of rehearsal. There was a main effect due to the time variable, $F(1, 14) = 16.08, p < .001$, with participants reporting talking less frequently about recent events ($M = 4.10$) than past events ($M = 5.50$). This is not surprising given the temporal difference. However, what is noteworthy is that when rehearsal was entered as a covariate into an ANOVA with narrative abstraction as the dependent variable, then the covariate regressed significantly, $F(1, 13) = 6.93, p < .03$, for the time main effect, but adding this covariate increased the time variable main effect substantially, $F(1, 13) = 14.35, p < .002$ (η^2 for the time main effect went up from .27 to .53 after entering rehearsal as a covariate).

Thus, differential rehearsal does not account for the observed differences in narrative abstraction.

Discussion

The results of this study provide evidence that events that are more distant in the past elicit the use of more abstract terms than events that are more recent. These preliminary findings appear to support the notion that once events are removed in time, they get stored in schematic form in memory, leading to a more abstract representation of social events in communication about these events, all other things being equal. These findings seem to invite taking the relationship between properties of memory and associated communicative styles more seriously into consideration. Factors such as the valence, importance, emotionality, vividness of an event, or degree of rehearsal do not seem to influence this pattern.

Experiment 2

In the second study, we tested a different prediction relating event age and linguistic abstractness. It is that the relationship demonstrated in Study 1 can be reversed. Instead of prompting participants to recall events of different dates and scoring their abstractness, we can give participants more or less abstract retrieval cues and score the dates of events that they produce in response. The properties of memory and language we reviewed above predict that the same relationship would be obtained in such a study, which is what we examined in Experiment 2: We hypothesized that abstract cues would evoke retrieval primarily of older events, compared with concrete cues that elicit retrieval of recent events.

The link between memory representations of social events and the ways we communicate about such events has a number of implications for the field of social cognition. We elaborate on these on a more speculative basis in the final section of this article. However, in order to begin to chart such potential implications, we introduced an auxiliary hypothesis in our second experiment. We investigated whether an attributional phenomenon known as the *dispositional shift* (Moore, Sherrod, Liu, & Underwood, 1979; Peterson, 1980) is manifested as a function of verbally anchoring events in memory. Our reasoning was the following. If it is the case that events prompted by adjectives are more distant in time and events prompted by verbs are of a more recent date, then one other correlated phenomenon should be the so-called dispositional shift phenomenon. We would thus expect events that are more distant in time to be explained more strongly with reference to one's dispositions and less strongly with reference to context, circumstances, or the dispositions of others. For events that are more recent in time—namely, events prompted with verbs—we would expect the reverse. In this case, we expected the classic actor–observer discrepancy—namely, weaker self-referent dispositional explanations and stronger other-referent dispositional explanations for the event.

It is possible to argue that abstract and concrete retrieval cues give rise to systematic differences in the types of events that are searched in memory. For instance, abstract cues may lead to the retrieval of events that are important and therefore more likely to be at a distant point in time than events retrieved by concrete cues. Similarly, abstract cues may lead to retrieving more emotional

events or less vivid ones. Further, as in the previous study, we considered the role played by frequency of talking about the reported events. In order to examine the potential influence of such factors on the type of retrieved event, we introduced them as dependent variables. Furthermore, event valence constituted an additional within-subjects variable in order to control for any possible systematic retrieval effects that may be driven by the positivity or negativity of past events.

Method

Participants

Forty-four undergraduates (17 men and 27 women) at the Free University Amsterdam participated in this study on a paid voluntary basis. Six participants were excluded because they were not able to provide answers to one or more of the retrieval cues.

Procedure

Participants were given a brief verbal instruction by a female experimenter and then provided with a questionnaire that required them to recall four events. The questionnaire started with the following description of their task:

This study is an investigation of how people remember social events. What we would like you to do is to remember four different events. We are interested in specific types of events. After you have noted the particular type of event in question, we shall ask you a number of questions about the event. Then we shall ask you to recall another event and so on.

Let us start with the first event. Think about an occasion when *you helped somebody*. Please think about such an event and note it down in very brief outline (not more than three lines). You will be asked to answer some questions about it, after you have completed this. Obviously, we shall treat all your answers confidentially.

Participants were then given some general instructions about how to use 7-point scales.

Abstraction Level

Abstraction level was controlled for by using either trait terms (abstract) or verbs depicting interpersonal events (concrete) as retrieval cues. This was a within-subjects variable. In total, there were 24 such retrieval cues: 12 adjectives and 12 verbs. The adjectives (trait terms) were *helpful, cheerful, honest, friendly, adventurous, modest, jealous, aggressive, afraid, arrogant, pessimistic, and passive*. The interpersonal verbs were *to help, to tell the truth, to thank, to convince, to compete with, to flirt, to criticize, to insult, to quarrel, to contradict, to blame, and to manipulate*. In the case of adjectives, the instructions were as follows:

There are different traits that make up a person's character, such as generosity, dominance, and so on, and these traits are displayed in different ways in everyday life. What we would like you to think about is your *helpfulness*. First of all: How *helpful* a person are you?

Participants answered this item on a 7-point scale, the endpoints of which were *not at all* (1) and *very much* (7). This was done to make participants think about helpfulness as a general trait rather than a particular behavioral occasion when they helped somebody. They were then asked to think of an occasion when they displayed this trait of helpfulness and briefly describe it in no more than three lines. The instruction for the concrete retrieval cues condition is provided above in the *Procedure* section.

Valence

Valence was also a within-subjects variable. Half of the retrieval cues were positive, and half of them were negative. Thus, each participant received a unique combination of four retrieval cues, one abstract–positive, one abstract–negative, one concrete–positive, and one concrete–negative. The order in which these occurred was randomized for each participant separately, and no 2 participants received the same combination.

Dependent Variables

Event dating. We used two measures to date events. First, participants were asked to write down the day, month, and year on which the recalled event had occurred. Second, at a later stage of the questionnaire they were asked to indicate on a 7-point scale “How long ago did the event you just described occur?” (1 = *very recently*, 7 = *a long time ago*).

Attribution of event cause. In order to ascertain whether there was a difference between perceived event causation as a function of abstraction level, we measured three dependent variables: (a) “To what extent did the event occur because of the type of person that you are?” (b) “To what extent did the event occur because of the personalities of the other person(s)?” and (c) “To what extent did the situation occur because of events or circumstances that nobody could have anticipated at the time?” Again, the scale endpoints were *not at all* (1) and *very much* (7).

Besides these two conceptually important variables, we also measured several other variables that might affect our predicted results. These included confidence: Participants were asked to indicate their confidence in dating the event by answering the question “How confident are you about dating the event?” This variable was measured on a 7-point scale, the endpoints of which were *not at all* (1) and *extremely* (7).

Qualitative differences between events. Qualitative differences between events were measured by three sets of variables. With respect to event vividness, five 7-point scales were used to tap vividness of recall. These were as follows: (a) “How vivid is the event you have just described in your memory?” The endpoints of the scale were *not at all vivid* (1) and *very vivid* (7). (b) “How well do you remember the details of the event?” The endpoints were *not at all well* (1) and *very well* (7). (c) “Can you clearly visualize how the situation unfolded when you think about the event?” The endpoints were *not at all* (1) and *very well* (7). (d) “How easy was it to recall the type of event we asked you for?” The endpoints were *very difficult* (1) and *very easy* (7). (e) “How easy was it to describe the event?” The endpoints were *very difficult* (1) and *very easy* (7). With respect to event emotionality, in order to control for possible variations in the emotionality of the recalled events and their possible influence on event dating, we used three different 7-point scales. These were as follows: “To what extent was the event an emotional one at the time?” “How emotional do you feel now when you think about it?” “How frequently did you think about the event after it took place?” In each case, the scale endpoints were *not at all* (1) and *very much* (7). Degree of rehearsal was measured by asking “How often have you talked to others about this event?” The scale endpoints were *not at all* (1) and *very often* (7). With respect to event importance, participants rated the degree to which the event they depicted was important on a 7-point scale (1 = *not at all important*, 7 = *very important*).

Results

Linguistic Abstraction and Dating of Recalled Event

The main hypothesis under investigation was that the more abstract event retrieval cues should elicit memories of events that are more distant in the past than the more concrete retrieval cues. We had two measures for this: one, the actual dating of the event (measured in months), and the other, an estimate of when the event

took place, made using a 7-point scale. The correlations between these two dating measures were positive, high, and significant (mean $r = .62$, $p < .01$). A similar outcome was observed for the logarithmic transformation of the month measure and the 7-point scale (mean $r = .72$, $p < .01$).

First, we analyzed event dating (number of months) as a function of abstraction level (abstract vs. concrete) by valence (positive vs. negative), both within-subjects variables with number of months as the dependent variable. Obviously, because people are more likely to remember recent over distant events, the distribution of the event dating variable in terms of number of months is skewed, with a long positive tail (namely, mostly recent events but a few distant events). This gives rise to a correlation between cell means and within-cell standard deviations, which is a problem for the assumptions of ANOVA. A logarithmic transformation of the event dating measure eliminates the correlation between cell means and standard deviations. The ANOVA yielded only a main effect for abstraction level, $F(1, 43) = 10.41$, $p < .001$, and a trend for valence, $F(1, 43) = 3.21$, $p < .08$. The respective means for the abstract and concrete retrieval cue conditions for the logarithmic transformation are $M_{\text{abs}} = 1.74$ ($SD = 1.14$), or 15.75 months, and $M_{\text{con}} = 1.24$ ($SD = .94$), or 7.81 months.

Not surprisingly, the 7-point scale event dating measure produced converging results. The ANOVA yielded a significant effect for abstraction level, $F(1, 43) = 5.70$, $p < .03$, and valence, $F(1, 43) = 5.98$, $p < .02$. Events elicited by abstract retrieval cues were judged to be in the more distant past ($M = 3.24$, $SD = 1.46$) than those elicited by concrete retrieval cues ($M = 2.61$, $SD = 1.24$). Further, events elicited with positive retrieval cues were found to be more recent ($M = 2.61$, $SD = 0.30$) than those elicited with negative retrieval cues ($M = 3.24$, $SD = 1.39$).

Dispositional Shift

The other hypothesis that was investigated in this experiment concerned the relation between how a person attributes the causes of an event as a function of the abstraction level of the retrieval cues. The hypothesis under investigation was that if abstract retrieval cues prompt events that are more distant in the past, then they are more likely to be attributed to the personality makeup of the participant. In the case of events that are prompted with concrete retrieval cues, the contribution of others' personality make-up was expected to be seen as stronger than that of the self.

This was examined in an abstraction level by valence by source (self vs. others vs. situational factors) within-subjects design. The dependent variable was the degree to which attribution was made to the respective sources. The predicted interaction between source and abstraction level was significant, $F(2, 86) = 10.13$, $p < .001$. The only other effect was a significant but trivial one due to source, $F(2, 86) = 52.61$, $p < .001$, and a trend for abstraction level, $F(1, 43) = 3.96$, $p < .06$. As can be seen in Table 1, the critical interaction was chiefly due to the significant differences between self and other attributions under the concrete and abstract conditions. The extent of attributing the event to the self under the abstract condition ($M = 5.28$, $SD = 1.16$) was somewhat stronger than the attribution of the event to the self under the concrete conditions ($M = 5.05$, $SD = 1.21$), $t(43) = 1.64$, $p < .15$. The reverse is seen in the case of attributions of the event to the other. The attribution to the other under the abstract condition is lower

Table 1
Sources of Factors Influencing the Event as a Function of
Prompt Abstraction Level and Perspective

Prompt	Self	Other	Situation
Verb	5.05 _c	5.55 _a	3.27 _d
Adjective	5.28 _c	4.40 _b	3.52 _d

Note. Judgments were made on a 7-point scale ranging from 1 (*not at all*) to 7 (*very much*). Means that do not share subscripts differ from each other significantly.

($M = 4.40$, $SD = 1.42$) than under the concrete condition ($M = 5.55$, $SD = 1.12$), $t(43) = 4.97$, $p < .001$. Furthermore, the comparison between self and other under the abstract condition, $t(43) = 3.47$, $p < .001$, as well as the concrete condition, was significant, $t(43) = 2.29$, $p < .02$.

Qualitative Differences Between Events

Of our other measures, confidence in event dating and rated event importance produced no significant effects. To determine whether the emotionality of the event might somehow account for the relationship between abstraction and event date, we conducted an analysis of covariance. The covariate was formed by combining the three dependent variables that measured affect into a single scale. These were (a) the participants' estimate of how emotional they were during the incident; (b) how emotional they are now, when they think about the event; and, finally, (c) how frequently they had thought about the situation since it happened. The respective Cronbach's alphas for the abstract-positive, concrete-positive, abstract-negative, and concrete-negative cells were .75, .83, .83, and .83. The covariate regressed significantly on valence, $F_{in}(1, 42) = 6.05$, $p < .02$, and the explained variance for the valence variable was reduced, $F_{in}(1, 42) = 2.66$, $p < .12$. More interesting, although the covariate showed only a trend toward regressing on the abstraction level variable, $F_{in}(1, 42) = 3.37$, $p < .08$, this was enough to increase the abstraction level variable main effect, $F_{in}(1, 42) = 13.20$, $p < .001$. Thus, although event emotionality has some relationship to the abstractness of the retrieval cues, it does not explain the difference that we find in event dating as a function of retrieval cue abstractness. With respect to event vividness, we measured the perceived vividness using a scale consisting of five variables, described earlier. These five dependent variables proved to constitute a highly internally consistent scale, as is reflected by the Cronbach's alphas for the four respective conditions of abstract-positive ($\alpha = .79$), concrete-positive ($\alpha = .80$), abstract-negative ($\alpha = .78$), and concrete-negative ($\alpha = .81$). An ANOVA with abstraction level and valence as within-subjects variables yielded only two significant main effects. The abstraction level effect, $F(1, 43) = 5.80$, $p < .02$, showed that, as expected, events elicited by abstract retrieval cues were less vivid ($M = 5.06$, $SD = 0.93$) than those elicited with concrete retrieval cues ($M = 5.39$, $SD = 0.96$). Further, the valence main effect, $F(1, 43) = 4.41$, $p < .05$, shows that positive events were recalled more vividly ($M = 5.38$, $SD = 0.96$) than negative events ($M = 5.06$, $SD = 0.86$). Entering affect as a covariate did not influence these outcomes. Further, entering event vividness as a covariate into the analysis using event dating as the dependent

variable was not significant, $F(1, 42) = 0.33$. Thus, vividness also cannot account for the key finding in this study: the effect of retrieval cues' abstractness on event dating. With respect to degree of rehearsal, as in the previous study, degree of rehearsal produced a significant abstraction level main effect, $F(1, 43) = 6.06$, $p < .02$ ($M_{abs} = 4.84$ vs. $M_{con} = 4.45$). Analyzing event dating with rehearsal as a covariate did not yield a significant regression on abstraction, $F(1, 42) < 1$, and did not affect the abstraction level main effect, $F(1, 42) = 7.92$, $p < .01$.

Discussion

The results of the second experiment provide strong evidence that there are distinct language registers associated with more distant or more recent events in memory. Instead of using a temporal anchor as in the first experiment, the second experiment used verbal anchors and shows that variations in the degree of abstractness of a verbal anchor are sufficient to elicit events that differ systematically in terms of when they took place. We found that if a recalled event is prompted with an abstract retrieval cue, then on average it is likely to be more than 8 months older than the average event prompted with a concrete retrieval cue (i.e., a verb). Thus, the hypothesis that abstract retrieval cues prompt an earlier event in memory finds support in these data. This finding dovetails with the results of the first experiment we report. In the first experiment, we were able to show that if one uses temporal anchors to elicit narratives of social events, then those events that have occurred in the distant past are communicated with more abstract words than events that have taken place in the immediate past. It would therefore seem that there is a link between properties of memory, the language registers that are used to depict or communicate the contents of memory (abstract and concrete), and, finally, the temporal anchoring of such social events (past and recent).

It is interesting to note in this context that the results of the two experiments strongly suggest that the valence of the event is orthogonal to the nature of its representation in memory. Indeed, in the second experiment, we also found that the emotionality of the event is unrelated to the temporal dimension. Further, we found that events prompted by abstract retrieval cues were less vivid than events prompted by concrete retrieval cues. However, event vividness is unrelated to event timing as the absence of a significant covariation suggests. The same holds for rehearsal—namely, how often the participants talked to others about an event.

The other implication of the way an event is stored in memory concerns how participants explained the event. The hypothesis was that more distant events would be explained with reference to more abstract dispositional properties of the agent. In contrast, events that are more recent in time—namely, those that are prompted with concrete verbal anchors—are more likely to be explained with reference to other persons or factors in the situation and less with reference to the dispositions of the self. The results provide support for this hypothesis. Namely, events that were prompted with a concrete retrieval cue were found to be explained with reference to others' dispositional qualities. In contrast, events prompted with adjectives were explained more readily with reference to the narrator's own dispositional influence on the event. It is possible to argue that there is a potential confound between the event anchors

and the explanations. That is, when participants are asked to think of an occasion when they were "helpful" and recount and explain it, then it is more likely that they will explain the occurrence of the event with reference to their own dispositions. In contrast, when one uses an action verb as an event anchor, then this gives rise to a more situational account of the depicted event. The literature on verb-mediated inferences (Semin, 1998), however, contradicts this interpretation. The research on verb-mediated causal inferences (e.g., Brown & Fish, 1983; Semin & Marsman, 1994; *inter alia*) suggests that action verbs cue in the event initiator or the agent (namely, the self) as the cause of the event. One would therefore expect that events prompted by action verbs would be equally likely to lead to self-referent dispositional explanations as events prompted with adjectives as verbal anchors. This conclusion is further supported by the finding that action verbs lead to strong spontaneous trait inferences that are agent referent (Marsman & Semin, *in press*). In addition, the dispositional shift literature (e.g., Moore et al., 1979) shows that temporal distance alone can lead to attributional shifts toward more dispositional causation without any potential confounding effect of different linguistic types or event prompts.

Experiment 3

There are three possible sources of concern that one can raise about Experiment 2 and its results. The first has to do with the types of retrieval cues that have been selected. The second has to do with the question of whether the types of events that are cued by abstract and concrete retrieval cues give rise to different types of semantic searches. Finally, one may wonder about the stability of the event dating findings. To address these issues, we conducted a third experiment. Let us start by clarifying these concerns to show how they shaped the third experiment.

The first concern suggests that incompatibility between abstract and concrete retrieval cues may be responsible for the differences in the temporal anchoring of the retrieved events. For instance, the adjective retrieval cues we selected may have described relatively rare states, and for this reason they may have prompted events that are further removed in time. In comparison, the verbs we used as retrieval cues may have been relatively common actions and therefore elicited recent events. We therefore decided to use a sample of morphologically matched adjective and verb pairs (e.g., to help–helpful) in a third experiment. This not only addresses the objection of domain incompatibility but also tests the generalizability of our findings from Experiment 2.

Second, consider the argument that abstract and concrete retrieval cues may give rise to different types of search in memory. To answer this suggestion, we controlled for event emotionality, importance, vividness, and frequency of talking about the event in Experiment 2. However, the argument may be extended. An abstract retrieval cue may give rise to a search for an event that is more typical of the category evoked by the term than a search prompted by a concrete retrieval cue. Thus, events retrieved by abstract cues may be more important, significant, or typical than those recalled from searches with concrete cues. (However, recall that we did not find any systematic differences between the retrieved events in terms of their importance in Study 2.) In addition, several factors have been found to be important in autobiographical memory research and may constitute additional potential con-

found. Thus, how emotional the recalled event is or whether the event is a positive or negative one (Skowronski, Betz, Thompson, & Shannon, 1991; Thompson et al., 1996) may affect event recall. The findings of Experiment 2, though, suggest that rehearsal, event significance, event emotionality, and event valence do not systematically covary with the retrieval cue manipulation nor are they related to event dating. Also, there may be systematic differences between the events as a function of verb type, namely, that events recalled by verbs as retrieval cues may be recalled in more detail and that events prompted by adjective searches are recalled more in terms of their gist, and our finding that vividness of event recall is stronger for events prompted by concrete retrieval cues may be related to these points.

In response to concerns like these, in the third experiment we introduced a number of different operationalizations of the potential covariates raised above in order to investigate whether these may be responsible for the systematic differences in event dating. The major modification in the design of the third experiment was the use of semantically matched abstract and concrete retrieval cues and the addition of potential event dating covariates, derived from, for instance, the research on autobiographical memory. We also dropped the question asking for a rating of how well the trait adjective describes the participant that was used as the initial part of the prompt in the adjective (abstract retrieval cue) condition in Study 2. In other respects, the design was identical to Experiment 2.

Method

Participants

Thirty undergraduates at the Free University Amsterdam participated in this study on a paid voluntary basis. All participants were native Dutch speakers.

Procedure

Participants were received individually by a female experimenter in a quiet room. She then proceeded with the instructions, which were as follows:

This is a memory experiment which will be detailed to you right away. After the experiment is over we shall give you all the details of what this research is about. During the experiment it is important that you concentrate on the task. Throughout, please follow my instructions carefully.

Now, let me describe the memory task. I shall ask you to remember specific events that have happened to you. For each event I shall be giving you specific prompts that will require you to think about a specific event that has happened to you. An example of such prompt is "to go to a party." I would like you to think about an occasion when you went to a party. It is important for you to recall a *specific* event, that is, a particular time you went to a party, and not just some general idea of what going to a party is like, a party you saw in a movie, a party someone else went to, etc. You should try to think of a specific event from your own past experiences that fits the prompt, and the moment you think of such an occasion you should indicate this by saying OK to me. I shall be timing you with a stopwatch while you are doing this to note down how long it takes you to think of such an event. However, don't try to rush, just say OK when you have thought of a specific event that fits the prompt. In all likelihood you will be

faster in remembering some events and slower on others. I shall wait for your OK and then stop the stopwatch.

After recalling an event participants were instructed to write down a few key words so that they could remember each event in order to answer some questions after the entire experiment was over. They were then given 12 retrieval cues, the first 4 of which were identical for all participants and served as tests trials to make sure that participants had understood all the instructions and to enable participants to get used to the procedure. These 4 test trials were then followed by the 8 critical trials.

Design

This experiment had a 2×2 within-subjects design,¹ whereby the first variable with two levels was the abstraction level of the retrieval cues and the second one was valence.

Abstraction level. The abstraction level of the retrieval cues was controlled for by using either trait terms (abstract) or verbs depicting interpersonal events (concrete). In total, we used 24 cues: 12 adjectives and 12 verbs (see Appendix A). The cues were chosen such that the abstract prompt was a morphological derivative of the concrete cue and came from the same semantic domain. Care was taken so that the abstract retrieval cues were not derived in the form of present participles (e.g., *to disappoint—disappointing*) or past participles (e.g., *disappointed*) that contain explicit temporal indications but were adjectives that are formed by the addition of a suffix (e.g., *help—helpful*).

Valence. Half of the retrieval cues were positive, and half of them were negative. Thus, each participant received a unique combination of 8 retrieval cues: 2 abstract-positive, 2 abstract-negative, 2 concrete-positive, and 2 concrete-negative. The order in which these retrieval cues were presented was randomized for each participant separately, and no 2 participants received the same combination. In addition, at the end of the experiment, participants had to rate all 24 terms for valence on a 7-point scale (1 = *negative*, 7 = *positive*).

Dependent Variables

Event dating. Two measures used here were identical to those used in Experiment 2, namely, event dating in terms of day, month, and year and a 7-point scale.

Dispositional shift measures. In order to ascertain whether there was a difference between perceived event causation as a function of abstraction level, we used the same three dependent variables that were used in Experiment 2. The only variation was that in the case of abstract retrieval cues, the instructions and measurement regarding the self-applicability of the adjective were omitted.

Qualitative differences between events. A number of dependent variables were included to investigate potential differences in the type and quality of events that are elicited by the different retrieval cues. This was done in order to check that the potential differences in temporal anchoring as a function of the abstraction level of retrieval cues are not covariates of such variables. With respect to event vividness, in this experiment we used only one scale to tap vividness of recall, namely, "How easy is it for you to visualize how this event unfolded?" The scale endpoints were *not at all* (1) and *extremely* (7). Further, the degree to which the event was judged to be important (event importance) was measured as in the previous experiment. Earlier research suggests that emotional events are dated more accurately than nonemotional ones (Skowronski et al., 1991; Thompson et al., 1996). We therefore included items tapping the following: (a) event duration, measured by the question "Approximately how long did this event last?" anchored with *very short* (1) and *very long* (7), and (b) event emotionality, measured by the question "To what extent was this event an emotional one?" anchored with *not at all* (1) and *extremely* (7). The same research suggests that positive events are dated more accurately than negative events. We therefore included the following variables: (c) degree

of positivity or negativity of the event for the participant, measured by the questions "To what extent was the event a positive one for you?" and "To what extent was the event a negative one for you?" These questions were answered on scales that were anchored with *not at all* (1) and *very much* (7). In order to investigate further event characteristics that may vary as a function of type of retrieval cues, we included the following measures: (d) likelihood of event recurrence, measured by the question "How likely is it that a similar event will happen to you?" It is possible that important events are recalled more accurately, and this may vary as a function of the linguistic category that is used as a retrieval cue. The next variable was used to investigate this possibility; (e) personal importance of the event was measured as follows. So that we could detect any potential differences in terms of the personal significance of the events they recalled, participants had to answer two questions that appeared in different parts of the response sheet per situation in the booklet they received. First they had to answer the question "How important was this event for you?" and later on, "How informative was what you did in this event about you as a person?" (1 = *not at all*, 7 = *very much*). Because the participants did not have to provide the experimenter with any details of the events they recalled, we checked (f) the degree to which the recalled events were personal ones by the question "Was the event a highly personal one?" Participants answered using a 7-point scale, the endpoints of which were *not at all* (1) and *very much* (7). It should be noted that this question was posed to the participants after they had completed the entire experiment. Participants were able to answer this question on the basis of the key word notations that they had made (and kept) for the 12 situations (4 trial and 8 experimental). Thus, in answering this question for the 12 situations, they consulted their key words and answered on this dependent variable for each event individually.

Results

Abstraction Level and Event Dating

The first hypothesis under investigation was that the more abstract retrieval cues should elicit memories of events that are more distant in the past than the more concrete retrieval cues. We had two measures for this: one, the actual dating of the event (measured in months), and the other, an estimate of when the event took place, made on a 7-point scale. The correlations between these two dating measures were positive, high, and significant (mean $r = .60$, $p < .01$). A similar outcome was observed after the logarithmic transformation of the month measure and the estimate of when the event took place on a 7-point scale (mean $r = .72$, $p < .01$).

An analysis of the event dating (number of months—after logarithmic transformation) as a function of the abstraction level of the retrieval cues (abstract vs. concrete) and by valence (positive vs. negative), both within-subjects variables, yielded the expected main effect for abstraction level, $F(1, 29) = 6.51$, $p < .02$. Events that were prompted with an abstract term were further removed in time—in months (mean months = 16.34; $M_{in} = 2.18$, $SD = 1.19$)—than events that were prompted by concrete terms (mean months = 6.83; $M_{in} = 1.48$, $SD = 0.94$). This analysis also yielded a significant interaction between abstraction level and valence, $F(1, 29) = 5.98$, $p < .01$, as can be seen in Table 2.

¹ In addition, this experiment had an orthogonal cognitive distraction manipulation—again, a within-subjects variable. The distraction consisted of the production of random numbers between 1 and 9. Because this manipulation did not have any systematic main and higher order effects, we do not report any of the details of this manipulation throughout this article.

Table 2
Dating as a Function of Prompt Abstraction Level and Valence

Dating type and valence	Verb <i>M</i>	Adjective <i>M</i>
Event dating (in months)		
Positive	6.85 _a	13.65 _b
Negative	6.82 _a	19.03 _c
Subjective event dating (on a 7-point scale)		
Positive	2.63 _{a,b}	2.87 _b
Negative	2.17 _a	3.25 _c

Note. Means that do not share subscripts differ from each other significantly. For subjective event dating, higher values from the 7-point scale indicate older events, and lower values, more recent events.

Not surprisingly, investigating event dating with the 7-point scale estimate produced converging results. The ANOVA yielded a significant effect for abstraction level, $F(1, 29) = 12.81, p < .001$; $\eta^2 = .31$. Events elicited by abstract retrieval cues were judged to be in the more distant past ($M = 3.05, SD = 1.41$) than those elicited by concrete retrieval cues ($M = 2.42, SD = 1.13$). Furthermore, the abstraction by valence interaction was significant, $F(1, 29) = 7.22, p < .02$. As can be seen from Table 2, this pattern replicates the outcome obtained with the measures of the actual dating of the event reported above.

Dispositional Shift

The next hypothesis was that events that are more distant in the past are more likely to be attributed to the personality makeup of the participant. In the case of events that are prompted with concrete cues, the contribution of others' personality makeup was expected to be stronger than that of the self. This was examined in an abstraction level by valence by source (self vs. others vs. situational factors) within-subjects design. The dependent variable was the degree to which attribution was made to the respective sources. The predicted interaction between source and abstraction level of retrieval cues was significant, $F(2, 29) = 5.29, p < .05$. As can be seen from Table 3, this interaction is mainly due to the difference between situational causes of the event and the difference between self and other event causation in the case of events prompted by adjectives ($p < .07$). The pattern, albeit weak, is identical to the one obtained in Experiment 2.

Analyses of Qualitative Differences Between Events

The outcomes for the univariate ANOVAs on the autobiographical variables can be seen in Table 4. These are reported as univariate ANOVAs rather than a multivariate ANOVA. We adopted this strategy because it is possible to argue that a nonsignificant multivariate analysis may conceal important differences on specific variables.

As can be seen in Table 5, only 2 of the 27 possible *F* values reach significance at an acceptable level and 3 show trends ($p < .10$). The two significant valence main effects are self-evident and show that the valence manipulation was effective. The degree to which an event was judged to be emotionally positive shows that positive retrieval cues gave rise to recalling events that were highly positive ($M = 4.75$) and negative retrieval cues did not ($M = 3.18$). The reverse is shown in the case of judgments of how

much of a negative emotional event the recalled occasion was. Negative retrieval cues gave rise to negative emotionality ratings ($M = 4.58$), and positive prompts did not ($M = 2.82$). It is important to note that only two out of the nine abstraction level and nine abstraction level by valence terms showed a trend; that is, in fact, less than one would expect by chance. It would therefore appear to be warranted to argue that the recalled events do not show any systematic variation as a function of the abstraction level of the retrieval cue. In short, none of the qualitative difference variables (event duration, event emotionality, degree of positivity or negativity of the event for the participant, likelihood of event recurrence, personal importance of the event, and degree to which the recalled events were personal) yielded any significant abstraction-level main effects or an interaction with valence.

Discussion

The central findings of Experiment 3 converge with those obtained in Experiment 2. Events prompted with adjectives were approximately 9 months older than events prompted by verbs. This outcome was found despite changes in the procedure and in the types of retrieval cues. Interestingly, valence effects were again found to be independent of the abstraction level of the retrieval cues. In addition, the diverse measures introduced to control for possible differences between the retrieved events as a function of abstract and concrete cues yielded no systematic effects as a function of type of retrieval cue. These findings suggest that for most of those variables that influence various aspects of autobiographical memory (e.g., event emotionality, event importance, and event valence; see Skowronski et al., 1991; Thompson et al., 1996) we obtained no systematic differences as a function of retrieval cue. We did, however, replicate the causal explanation pattern of the events that are cued by adjectives and verbs that was obtained in Experiment 2. Events cued by adjectives were perceived to be caused more by the participant in contrast to events cued by verbs. The reverse pattern was observed from the perspective of the other. Events cued by adjectives were shaped to a lesser extent by the dispositional makeup of others than events cued by verbs.

These results provide support for the hypotheses for which we had designed the third study. Nevertheless, these results may not be entirely convincing for somebody who entertains a purely lexical hypothesis. From the point of view of a lexicalist, it is possible to raise the following argument concerning these findings as well as those obtained in Experiment 2: Adjectives and verbs have specific semantic properties that are responsible for both the differences in temporal anchoring and the pattern of dispositional shift we obtained. Indeed, we argued in the introduction to this

Table 3
Sources of Factors Influencing the Event as a Function of Prompt Abstraction Level

Prompt	Self	Other	Situation
Verb	5.13 _{a,c}	5.40 _{a,c}	3.29 _b
Adjective	5.30 _c	4.78 _a	3.66 _b

Note. The difference between self adjective and other adjective is a trend ($p < .07$, marginally significant); for all other differences, means with different subscripts differ at the .05 level.

Table 4
Control Variables for Qualitative Differences

Variable	Abstraction level $F(1, 29)$	Valence $F(1, 29)$	Interaction $F(1, 29)$
Event vividness	3.92†	0.17	2.90†
Event duration	1.34	0.06	3.94†
Event emotionality	1.02	1.60	0.44
Recurrence likelihood	0.15	0.34	1.34
Event importance	2.24	0.03	0.21
Positive experience	1.01	48.68**	0.08
Negative experience	0.73	51.55**	0.00
Self-informativeness	0.49	0.11	1.46
Private	0.20	0.56	1.38

† $p < .10$ (marginally significant). ** $p < .01$.

article that the abstraction and concreteness of predicates function as temporal markers. We also argued in the introduction that interpersonal predicates are regarded here as tools that are deployed in the service of psychological constraints. The constraints that we are investigating here are systemic psychological constraints, namely, properties of human memory. It is possible, however, that the lexical properties of interpersonal predicates alone, without the intervention of any memory constraints, are sufficient to produce both the systematic temporal differences and the pattern of results that underlies the dispositional shift.

This would mean that the results of Studies 2 and 3 are due to particularities of the semantic or lexical properties of adjectives and verbs and have nothing to do with the properties of memory. Such an argument suggests that events that are generally more removed from the here and now (past or future) are marked more abstractly, and events that are closer to the present (past or future) are depicted more concretely. Consequently, abstract cues prompt events perceived to be distant and concrete cues prompt events that are assumed to be more recent, in general. (Obviously, a lexical view would not be able to account for the outcomes obtained in the first study.)

If such a generalist lexical argument is correct, then it suggests a futuristic mirror image of Experiments 2 and 3. The lexical argument takes one back to the future for a critical test between (a) a lexical hypothesis and (b) the hypothesis advanced here—namely, that linguistic markers of time are steered by the properties of memory. Consequently, one could mirror the logic that led to Experiments 2 and 3 here and examine whether using abstract and concrete cues as prompts for future events would give rise to precisely the same systematic temporal dating outcomes and dispositional shift outcomes. If it is the case that the semantic or lexical properties of abstract and concrete cues on their own convey implicit information about temporal distance—independent of their relations to memory systems—then participants writ-

ing about a future event prompted with an abstract cue should anchor it in the more distant future as compared with an event prompted by a concrete cue.

Furthermore, if the dispositional shift findings are due merely to the semantic properties of the adjectives, then we would expect the same findings to emerge for events that are generated for the future. This would be true because it is not the nature of the event but rather the nature of the prompt that drives the systematic outcome that is observed under the dispositional shift. In contrast, if the dispositional effects that we obtained in the previous two experiments are due to an interaction between properties of memory and the language registers that are activated by the retrieval cues, then we should not find the dispositional shift when participants predict future events as a function of abstract and concrete prompts.

In short, if it is the case that abstract and concrete language are specific memory system registers, then we would expect only systematic temporal relationships between events from the past. Going back to the future, we would not expect the same relationship to obtain because these events are hypothetically generated and therefore are not retrieved from any memory system. This is precisely what we investigated in Experiment 4.

Experiment 4

Participants were asked to think about a hypothetical event that was likely to happen to them for a given prompt that was either an adjective or a verb and write it down in some detail. Subsequently, they were asked to judge when in the future this event was likely to happen—namely, the immediate or distant future. A merely linguistic convention—goal-oriented narrative perspective would predict that events prompted by verbs should be anchored in the more immediate future, whereas events prompted by adjectives should be anchored in the more distant future. No such systematic outcomes would be expected from the properties of memory. In addition, we used a number of potential covariates to examine the possible effects that are due to semantic features of the prompts we used.

Method

Participants

Twenty-four undergraduates at the Free University Amsterdam participated in this study on a paid voluntary basis. All participants were native Dutch speakers.

Table 5
Sources of Factors Influencing the Event as a Function of Prompt Abstraction Level and Perspective

Prompt	Self	Other	Situation
Verb	5.04	4.85	3.10
Adjective	5.54	5.54	3.22

Procedure

Participants were given a brief verbal instruction by a female experimenter and then were provided with a questionnaire that required them to predict eight events. The questionnaire started with the following description of their task:

This study is an investigation of how people predict and envision new social events. We would like you to envision eight different situations that could happen to you at a future point in time. We are interested in particular types of situations that we shall specify below. After you have written down the instructed type of future event we are interested in, we shall ask you a number of questions about this event. Then we shall proceed with the next situation, and so on.

Let us now begin with the first event. Please think about an event in the future in which you "help somebody" ["are helpful"] and then write it down. Please try to describe such a future event that may happen to you in as much detail as you can.

Prompt Abstraction Level and Prompt Type

The abstraction level of prompts was controlled for by using either trait terms (abstract) or verbs (concrete). In total, there were 24 such prompts: 12 adjectives and 12 verbs, which are shown in Appendix B. Half of the prompts were semantically matched concrete and abstract prompts (e.g., *to help* and *helpful*). The other half consisted of 6 adjectives and 6 verbs that were not semantically related to each other. Thus, prompt type was controlled for (see Appendix B for details).

Valence

Half of the prompts were positive, and half of them were negative. Thus, each participant received a unique combination of 8 prompts: 2 abstract-positive, 2 abstract-negative, 2 concrete-positive, and 2 concrete-negative. The order in which these prompts were presented was randomized for each participant separately, and no 2 participants received the same combination. In addition, at the end of the experiment, participants had to rate all 24 terms for valence on a 7-point scale (1 = *negative*, 7 = *positive*).

Design

The study had a prompt abstraction level (verb vs. adjective) by prompt type (matched vs. unmatched) by valence (positive vs. negative) within-subjects design.

Dependent Variables

Event dating. Two measures were used to date events. First, participants were asked to indicate on a 7-point scale "When is it likely that an event such as the one you have just described will occur?" The scale endpoints were *very soon* (1) and *a long time from now* (7). Second, after they had written down all eight situations and completed the items used as dependent variables that appeared after each event description, they were asked to indicate on a 7-point scale "Within which period do you expect an event comparable to the one you described for the prompt 'to help somebody' ['helpful'] to occur?" They then had to check off one of the following six boxes: *within a day* (1), *within a week* (2), *within a month* (3), *within a quarter of a year* (4), *within half a year* (5), *within a year* (6), and, finally, *within a few years* (7).

Dispositional shift measures. The measures used to tap dispositional shift were identical to those used in Experiments 2 and 3.

Abstraction level of narrative. The abstraction level of the narrative was obtained by a simple calculation of the number of verbs and adjectives

used in depicting the hypothetical events relative to the word length of the narrative.

Control dependent variables. A further set of seven dependent variables was used after each event in order to be able to check potential alternative explanations for the two hypotheses that are advanced. These dependent variables were as follows: (a) perceived difficulty of thinking about the event: Participants were asked to indicate on a 7-point scale how difficult they found it to think about the particular event (1 = *very easy*, 7 = *very difficult*). (b) Anticipated event vividness: We used the scale used in Experiment 3 in order to tap the vividness of the future event, namely, "How easy is it for you to visualize how this event would unfold?" The scale endpoints were *not at all* (1) and *extremely* (7). (c) Anticipated event emotionality: This variable was measured by the question "To what extent is this event likely to be an emotional one?" The scale endpoints were *not at all* (1) and *extremely* (7). (d) Perceived typicality of event for the prompt: Participants were asked to indicate how typical they thought that the particular event they described was for the prompt that they had received. The scale endpoints were *not at all* (1) and *very much* (7). (e) Frequency of comparable previous events: Participants were asked to indicate how often they had experienced an event comparable with the one they had described in the past. Responses were given on a 7-point scale with endpoints *very infrequently* (1) and *very frequently* (7). (f) Anticipated degree of positivity or negativity of the event: The final question was "To what extent is the event you described a positive or negative one?" This question was answered on a scale with endpoints *very negative* (1) and *very positive* (7). (g) Valence manipulation check: After the entire experiment was over, all participants were asked to rate each event description for its valence. They rated each description on a 7-point scale with endpoints *negative* (1) and *positive* (7).

Results

Throughout the analyses the prompt type (semantically matched and unmatched) variable had no systematic effects, and it is therefore not reported in any of the analyses below.

Event Dating

The first lexically driven hypothesis was that abstract future prompts would elicit events that are in the more distant future than concrete prompts. We had two measures for this. One measured the subjective estimate of when at a future point in time this event would occur. The other was a 7-point scale operationalized in terms of perceived time expected to lapse before an event similar to the one depicted in the narrative was likely to occur. The correlation between these two dating measures was positive, high, and significant (mean $r = .72$). An ANOVA with abstraction level (verb vs. adjective) and valence (positive vs. negative), within-subjects variables in both cases, yielded no significant main effect for abstraction level on both measurements of predicted time lapse, both $F(1, 23) < 1$. The interaction with valence was also not significant. There was, however, a significant main effect for valence, $F(1, 23) = 5.58, p < .03$, suggesting that events elicited with positive prompts were expected to happen earlier ($M = 3.17$) than those elicited with negative prompts ($M = 3.70$).

Dispositional Shift

The dispositional shift hypothesis was examined in a prompt abstraction level (verb vs. adjective) by source (participant vs. other vs. situational factors) within-subjects-design ANOVA. The dependent variable was the degree to which the event was attrib-

Table 6
Analyses of Event Qualitative Differences as a Function of Abstraction Level and Valence

Variable	Abstraction level $F(1, 23)$	Valence $F(1, 23)$	Interaction $F(1, 23)$
Perceived difficulty	5.44*	15.38**	<1.00
Event vividness	<1.00	<1.00	<1.00
Event emotionality	<1.00	<1.00	4.89*
Event typicality	<1.00	<1.00	<1.00
Previous frequency	<1.00	<1.00	14.33**
Event positivity–negativity	<1.00	43.91**	<1.00
Valence	<1.00	168.88**	<1.00

* $p < .05$. ** $p < .01$.

uted to the respective sources. The critical interaction term was nonsignificant, $F(1, 23) < 1$, suggesting that the dispositional shift effects were not due to the semantic properties of the prompts. The means are provided in Table 5 in order to show that the pattern of influences obtained in this experiment does not resemble that obtained in Experiments 2 and 3. There was a trivial source effect, $F(1, 23) = 80.49$, $p < .001$, suggesting that contextual or situational factors were of less influence ($M = 3.16$) than the properties of the participant ($M = 5.29$) and those of others ($M = 5.08$). Further, a main effect was obtained for abstraction level, $F(1, 23) = 5.82$, $p < .05$. Overall influence was judged to be higher for events prompted by adjectives ($M = 4.68$) than for events prompted by verbs ($M = 4.33$). This finding in itself suggests a general lexical effect and one that was not obtained in the previous two experiments.

Analyses of Qualitative Differences Between Events

The outcome of the univariate ANOVAs for the seven dependent variables are reported in Table 6. As can be seen, participants found it easier to think about future events prompted by adjectives ($M = 2.47$) than those prompted by verbs ($M = 3.10$). Furthermore, events for positive prompts were easier to think about ($M = 2.37$) than for negative prompts ($M = 3.12$). No differences were obtained for event vividness and event typicality. Judgments of how positive or negative the event would be and event valence, which was introduced as a check, showed the expected main effect due to the valence variable. Positive prompts gave rise to more positive event valence ratings ($M = 6.24$) than negative prompts ($M = 2.61$), and the events were, respectively, anticipated to be more positive ($M = 4.91$) and negative ($M = 2.61$). Finally, anticipated event emotionality and frequency of comparable previous experiences yielded only an interaction. These two dependent variables constituted direct and indirect manipulation checks on the prompt valence.

The interaction for anticipated event emotionality was due to the fact that events generated with positive adjectives were rated as less emotional ($M = 3.56$) than events in the other three conditions, namely, positive verb ($M = 4.44$), negative verb ($M = 4.08$), and negative adjective ($M = 4.48$), which did not differ from one another. Finally, frequency of comparable previous experiences showed that negative-adjective-prompted events ($M = 2.96$) and events prompted by positive verbs ($M = 3.45$) were the least frequently encountered events. The most frequently

encountered events were those generated by positive adjectives ($M = 4.13$) and negative verbs ($M = 4.19$).

Experiment 5

Method and Results

Experiment 5 consisted of a precise replication of Study 4, which we conducted because the main conclusion from Study 4 was a null result, and we wished to demonstrate that low power was not responsible for this outcome. The main difference was the order in which the two event dating measures were presented. In Study 4, the 7-point scale was the first question after each narrative and was anchored with *very soon* (1) and *a long time from now* (7). Then, after all eight narratives had been written, the other event dating scale was used. This asked for the period within which participants expected a comparable event to occur. In Experiment 5 the order of these scales was reversed. This study, which had 28 paid volunteer participants, produced the same results. The event dating main effect as a function of prompt abstraction level was not significant for either measure, $F(1, 27) < 1$. Again, the critical interaction for the dispositional shift hypothesis did not reach significance, $F(2, 54) = 1.82$. In addition, in this study we did not obtain the significant main effect for prompt abstraction level, $F(1, 27) < 1$.²

Discussion

The results of Experiments 4 and 5 do not show any systematic effects of prompt abstractness on event dating or, for that matter, dispositional shift. Abstract and concrete prompts did not influence event dating, although valence did. Positive events were anticipated to be in the not-so-distant future, whereas negative prompts generated events judged to be in the more distant future. This, interestingly, reflects a mirror image of the valence effects obtained in Experiment 2, in which the temporally proximal events were the more positive ones and the ones more removed in time were the more negative ones. Thus, valence effects may be due to semantically driven biases. Negative events are those that are either in the distant past or the distant future, and people appear to prefer surrounding their immediate past and future temporal environments with predominantly positive effects. This phenomenon, interesting as it is, is orthogonal to the abstraction-level manipu-

² This experiment did not include dependent variables (c) to (g) that were used in Study 4. All other results were identical to those obtained in Study 4.

lation and thus independent of the issue of forward or backward event dating.

With respect to the dispositional shift, we found that the systematic outcomes obtained in Experiments 2 and 3 did not surface, even as trends. In Experiment 4 we found that future events prompted by adjectives (traits) were judged to be more determined irrespective of the source of influence (self, others, or the situation) than future events prompted by verbs. If this effect had been replicated in Study 5, then one could have tentatively argued that this is due to a generalized lexical or semantic effect. Adjectives semantically convey event causation inferences to be located in persons (irrespective of whether it is the self or another), and verbs less so. However, this seems to be an unstable effect.

In our view, this pattern of results allows two related conclusions. First, abstract and concrete terms give rise to systematic event dating differences when they function as retrieval cues (Experiments 2 and 3) but not as future event prompts (Experiments 4 and 5). This pattern supports the postulated connection between basic properties of memory and a form of social behavior, namely, communicative language. If the effects that were observed for event dating and dispositional shift were merely semantically or lexically driven effects and independent of memory processes, then these last two experiments should have yielded results comparable with those obtained in Experiments 2 and 3. Second, the variables introduced to detect whether there are any qualitative differences between future events generated by abstract and concrete prompts did not show any systematic patterns either. The last experiments, when taken in conjunction with Experiments 2 and 3, also cast doubt on whether any systematic covert correlate (semantic or otherwise) of the retrieval cues alone can be responsible for the observed event dating effects for events from the past.

Conclusions

The results presented in this article demonstrate a specific connection between properties of memory and a form of social behavior: communicative language. We have tried to show that temporal markers for social events are systematically steered by the functioning of human memory. The question that we started with addressed the properties of interpersonal predicates by which temporal references or frames are marked. We hypothesized, on the basis of earlier work, that abstract terms mark distant events and concrete terms mark recent events. We further argued that the lexical properties of linguistic tools serve psychological functions that are contextually manifested. Thus, if memory does impact language use, then it should influence the narration of past events as a function of when they occurred (Study 1). Moreover, if such memory properties are directly tied up with specific language registers, then they should influence the type and date of event that is retrieved from memory. This is precisely what we have demonstrated in Studies 1, 2, and 3. These studies show this connection in different ways. In Study 1 we found that when participants were cued to report events from different times in the past, language use varied as a function of time, with more abstract language used for more temporally distant events. In Studies 2 and 3 we conceptually reversed the experimental paradigm and found that when participants were cued with verbal event descriptions of different types, they recalled events from different time periods. More abstract cues led to recall of events from more distant times in the past.

None of these findings were qualified by the valence of the event. Finally, in Studies 4 and 5 we found that abstract and concrete prompts do not give rise to predictions of events at systematically differing distances in the future. Such a null result shows that the effects in the earlier studies were not due simply to implicit properties of the prompts but arise only when the prompts are used to cue the retrieval of events from memory.

The key property of memory for the predictions in this article is the relative emphasis on specific details for recent memories and on general gist for distant memories. Many theories of memory may predict this property. Of these, the most recent, integrative, and well-supported model suggests that humans possess two separate memory systems with distinct properties. Many theorists have recently put forward similar ideas (e.g., Alvarez & Squire, 1994; see Schacter & Tulving, 1994), but we focus on the model of McClelland et al. (1995). We do this because considering our findings within the framework of this type of model furnishes links to other domains in social psychology, as we argue below.

McClelland et al. (1995) advanced three types of evidence for the existence of two memory systems: a functional argument, as well as psychological and neuropsychological evidence. The functional argument is that human memory must meet two different types of demands that are incompatible and cannot be met by a single system. One demand is to record information slowly and incrementally so that the contents of memory reflect a large and reliable sample of experiences as a stable basis for valid predictions about the environment. A slow-learning memory system fills this need. It has the properties typically assumed for a "schematic" memory in social and cognitive psychology (Fiske & Taylor, 1991; Rumelhart, Smolenski, McClelland, & Hinton, 1986), recording repeatedly encountered regularities in the environment and using them to fill in unobserved details and interpret new information. Slow-learning memory is also responsible for the learning of cognitive and motor skills, which must be practiced many times to be fully learned.

A second demand on memory is to record novel information quickly, ideally on a single exposure, so that a potentially important experience can be remembered on a future occasion. This fast-learning system has many of the properties typically assumed of episodic memory, including the ability to record specific events together with information about their context. Because the recording of contextual information is essential in order to remember that a stimulus was encountered at a particular time and place (rather than simply knowing that the stimulus is generally familiar), this fast-learning memory system is the one that is tapped by explicit memory measures like recall and recognition. Both types of memory are important for overall functioning, but the competing demands for slow and fast learning are unlikely to be met within a single system.

McClelland et al. (1995) and the other related models propose, therefore, that fast and slow learning are handled by separate memory systems. New incoming information is simultaneously recorded in both systems, in sketchy and abstract form in the slow-learning system and in relatively complete form as a configuration of stimulus and contextual attributes in the fast-learning system. Over time, the information is transferred in the process of "consolidation" from the fast-learning to the slow-learning system, so that eventually a more complete event record can be retrieved from the slow-learning system.

Several types of evidence support this idea (for a review, see McClelland et al., 1995). Neuropsychological research demonstrates that lesions to the hippocampus and related brain structures damage certain types of memory performance while leaving others intact. Those that are impaired (such as the ability to learn new associations on a single exposure or to explicitly remember recently encountered information) correspond to those that are theoretically mediated by the fast-learning system. Other types of memory performance, such as the ability to extract the general gist or summary from a series of novel stimuli, to learn skills, and to show effects of recent experiences on certain types of implicit memory tests, are relatively unimpaired. These effects are theoretically mediated by the slow-learning system, which can extract regularities from a series of novel stimuli (because the aspects the stimuli have in common are repeated several times) and which preserves information about the familiarity of different types of stimuli (though without recording the context in which they were encountered). The fast-learning memory system necessarily has relatively limited capacity. Information stays in this system for only a limited time and then is lost if it has not been transferred to the larger-capacity slow-learning system. Relevant evidence includes the fact that hippocampal lesions impair retrieval of recent events (still recorded in the fast-learning system) to a greater extent than more remote past events (that have been transferred to the slow-learning system).

Psychological evidence also supports the existence of two memory systems with distinct configurations of properties. Relative to the slow-learning system, the fast-learning system is more accessible to conscious awareness, being the system that handles explicit recognition and recall. This system also requires conscious attention to store new information, whereas the operation of the slow-learning system is more automatic and less sensitive to attention allocation. The fast-learning system is also particularly attuned to unexpected or novel information, in contrast to the slow-learning system's general focus on the typical, usual, and expected. Finally, the fast-learning system records an event in detail, storing it as a configuration of specific attributes including perceptual, inferred, and contextual information. In contrast, the slow-learning system, being unable to form a new representation on a single experience, can record only that a new experience is an instance of an existing concept, thereby forming a relatively abstract or gist record of the event. See McClelland et al. (1995) for a lengthy review of evidence supporting this model.

A dual-memory systems model provides a specific basis for understanding the emphasis on gist in more distant memories (held in the schematic slow-learning system) and specific details in more recent memories. It not only makes that prediction but also accounts for a diverse array of other psychological and neuropsychological evidence as reviewed above (see McClelland et al., 1995) and therefore is strong on theoretical integrativeness and parsimony. Of course, the studies reported in this article were not designed as tests of the dual-memory model. Still, our results are consistent with predictions generated from this model about how people are likely to linguistically structure their communication about past events and how specific types of predicates that differ in their degree of abstraction anchor temporal references to the past.

Adopting a dual-memory-model perspective can provide other predictions that have social psychological relevance. Recall that

the perceiver's expectancies as well as temporal reference are predicted to influence what memory system an event is stored in (McClelland et al., 1995). Expected, typical events mainly affect the slow-learning system, whereas unexpected events are recorded in the fast-learning system. As Smith (1998) pointed out, this prediction is consistent with the typical pattern of findings in social cognition relating the strength of an expectancy to the relative memory advantage for expected versus unexpected information. People recall more expectancy-inconsistent information when forming a new impression but more expectancy-consistent information when they possess a durable, solid expectation (Stangor & McMillan, 1992). This pattern may reflect the differences between the two postulated memory systems: one that learns quickly and emphasizes new and unexpected information and one that learns more slowly and gradually accumulates information about general patterns and observed regularities.

We have just described two hypotheses, one relating memory systems to linguistic abstractness and another relating memory systems to expectation consistency. Putting these together leads to the prediction that expectation-consistent and -inconsistent events will be communicated in systematically different ways: Expected events will be described using more abstract language (more adjectives) and unexpected events with more concrete language (such as action verbs). The *linguistic intergroup bias* (Maass, Salvi, Arcuri, & Semin, 1989) can be seen as a specific application of this hypothesis. People tend to describe positive acts by in-group members, and also undesirable acts by out-group members, with more abstract language than the reverse (negative in-group acts and positive out-group acts). If we assume that people in general expect in-group members to behave more positively than out-group members, this is exactly the predicted pattern. In two recent series of experiments, Maass and her colleagues (Maass, Ceccarelli, & Rudin, 1996; Maass, Milesi, Zabbini, & Stahlberg, 1995) have orthogonally manipulated the desirability and expectancy consistency of the relevant behaviors. These results show that expectancy-consistent behaviors are described at a higher level of abstraction than expectancy-inconsistent behaviors. Indeed, Maass et al. (1995) concluded that differential expectancies are sufficient to produce the linguistic bias and that the phenomenon is not limited to the intergroup context but is equally valid for expected and unexpected individual behaviors. Thus, the linguistic intergroup bias may be another manifestation in the social sphere of the underlying properties of two distinct memory systems.

Finally, the dual-memory model has other implications for social psychological theory. For example, it is not only possible but likely that people hold inconsistent information in the two systems. The slow-learning system maintains information about expected events, and it is precisely an observed event's unexpectedness—its inconsistency with general schematic knowledge—that makes it likely to be noted in the fast-learning system. Thus, investigations of the ways the two systems interact may help clarify how people deal with inconsistent information when they have to make summary judgments or behavioral decisions. It is also possible that different types of judgments, or judgments made under varying cognitive loads, preferentially use information from different memory systems. Social psychological theories have typically assumed that memory is unitary, that all memory contents reside in a single system with uniform storage and retrieval properties. However, in these and other domains, overturning this general

implicit assumption may permit new insights and reexamination of many significant issues relating social cognition to communication and other forms of social behavior.

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(Appendixes follow)

Appendix A

Experimental Stimuli Used in Study 3

To help—helpful	To cooperate—cooperative
To compete—competitive	To quarrel—aggressive
To forgive—forgiving	To tell the truth—honest
To dominate—dominant	To criticize—critical
To compliment—complimentary	To understand—understanding
To trouble—troublesome	To manipulate—manipulative

Appendix B

Experimental Stimuli Used in Study 4

Matched

Positive

To help; helpful; to tell the truth; honest; to forgive; forgiving.

Negative

To criticize; critical; to quarrel; aggressive; to dominate; dominant.

Unmatched

Positive

To seek advice; to support; to invite; friendly; patient; complimentary.

Negative

To lie; to trouble; to complain; suspicious; nervous; impolite.

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